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PATENT SPECIFICATION 1,049,129

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COMPLETE SPECIFICATION.

Method of Producing a Varnish Coating on Articles of Ethylene Polymerizates, polystyrene and Polyvinyl Chloride.

We, SCHEKOLIN A.G., a corporate body subject to the laws of the Principality of Liechtenstein, of Schaan, Principality of Liechtenstein, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be described in and by the following statement:—

Heretofore the production of a well-adhering, non-tacky, highly elastic as well as odourless and tasteless varnish coating on articles, e.g. bottles and tubes, made of polyethylene, polystyrene and polyvinyl chloride and copolymers of said compounds has met with difficulties; one has not yet succeeded in producing a varnish coat in which all the properties mentioned above are satisfactorily combined and which is equally suitable as a primer for printing.

According to the present invention there is provided a composition for forming a varnish coat on articles of polyethylene, polystyrene or polyvinyl chloride or copolymers of said compounds which comprises a partially copolymerised mixture of an acrylic monomer with an ethylenically unsaturated oil modified glyceryl phthalate condensation resin and a polymerisation catalyst, an oil-modified epoxy resin, a low molecular weight polyethylene, a plasticiser and a solvent comprising a mixture of high-boiling saturated hydrocarbons.

The invention also provides a method of producing a varnish coat on an article of polyethylene, polystyrene or polyvinyl chloride or copolymers of said compounds which comprises applying to the surface of such an article a solution comprising a partially copolymerised mixture of an acrylic monomer with an ethylenically unsaturated oil modified glyceryl phthalate condensation resin and a polymerisation catalyst, an oil-modified epoxy resin, a lower molecular weight polyethylene, a plasticiser and a solvent comprising a mixture of high-boiling saturated hydrocarbons, followed by drying of the coated article.

The coating which may be applied by roll-coating, spraying or dip-coating is preferably dried at about 60° C.

The above-mentioned composition of the varnish, the properties of which are due to the combination of all the components indicated, is particularly advantageous if the surface of the plastics material has to be printed. In this case the printing colour is applied, e.g. in offset printing, onto the still slightly tacky, i.e. only partly polymerized, varnish coat. Only after the printing procedure is the varnish completely dried. Thus, the varnish serves as primer for the printing colour. During the complete drying varnish particles diffuse through the printing colour so that the print is protected and provided with a high gloss. Hence, the varnish and the printing colour are bonded inseparably to the surface coated.

A specially suitable acrylated alkyd resin is one obtained from methyl methacrylate and glyceryl phthalate modified with about 40% ricinoleic acid. The oil-modified epoxy resin, enhances the resistance to chemicals. By using partly low-molecular weight ethylene polymers with a mean molecular weight of about 2000 the long service elasticity of the varnish and the resistance to abrasion are enhanced. Moreover, the static charge of the surface of the plastic during the coating is reduced so that the harmful repulsion of particles is avoided.

[*Price* 4*s.* 6*d.*]

The plasticizer used may be a linear polyester known for this purpose. By way of example, it should have a volatility below 0.3% within 2 hours at 130° C so that the undesirable migration of the plasticizer in the varnish film is prevented. Saturated hydrocarbons having a specific weight of at least 0.88 g/cm³, are particularly suitable, and their use in combination with the low-molecular weight ethylene polymers assists in preventing the objects being coated from sticking to the printing machine during the printing process.

Cobalt naphthenate may be added so as to regulate in known manner the drying properties of the varnish composition. By adding pigments the varnish coat can be coloured in the usual way.

By way of illustrating the invention reference is made to one example of a composition of a varnish used for coating articles of polyethylene:

73.9 parts by weight of a mixture of methyl methacrylate and glyceryl phthalate condensation product modified with 40% by weight of ricinoleic acid,

16.8 parts by weight oil-modified epoxy resin, obtained from bis-phenol A and epichlorhydrin-epoxy equivalents 870—1025 molecular weight 1400—1600 modified by incorporation of 40% by weight ricinoleic acid,

1.5 parts by weight low-molecular ethylene polymers (Molecular weight 2000),

1.8 parts by weight of a linear polyester plasticizer obtained by esterification of adipic acid and/or sebacic acid with polyglycol, having a saponification number 450—550 and molecular weight 2,100—2,200,

5.9 parts by weight clear paraffin oil, and 0.03 parts by weight cobalt naphthenate are dissolved in the ratio 1 : 1 in a mixture consisting of 85.6 parts by weight ethylene glycol monoethyl ester,

1.5 parts by weight petroleum spirit and 12.9 parts by weight high-boiling aromatic hydrocarbons with an aromatic content of at least 93%.

WHAT WE CLAIM IS:—

1. A composition for forming a varnish coat on articles of polyethylene, polystyrene or polyvinyl chloride or copolymers of said compounds which comprises a partially copolymerised mixture of an acrylic monomer with an ethylenically unsaturated oil-modified glyceryl phthalate condensation resin and a polymerisation catalyst, an oil-modified epoxy resin, a low molecular weight polyethylene, a plasticiser and a solvent comprising a mixture of high-boiling saturated hydrocarbons.

2. A composition in accordance with claim 1 wherein the partially copolymerised mixture includes methyl methacrylate as the acrylic monomer and the glyceryl phthalate condensation resin is modified with ricinoleic acid.

3. A composition for forming a varnish coat on articles of polyethylene, polystyrene or polyvinyl chloride or copolymers of said compounds substantially as described.

4. A method of producing a varnish coat on an article of polyethylene, polystyrene or polyvinyl chloride or copolymers of said compounds which comprises applying to the surface of such an article a solution comprising a partially copolymerised mixture of an acrylic monomer with an ethylenically unsaturated oil-modified glyceryl phthalate condensation resin and a polymerisation catalyst, an oil-modified epoxy resin, a low molecular weight polyethylene, a plasticiser and a solvent comprising a mixture of high-boiling saturated hydrocarbons, followed by drying of the coated article.

5. A modification of the method claimed in claim 4 wherein coloured matter is printed on the varnish coated surface prior to complete drying of the coated article, i.e. while the varnish coat is still tacky.

6. A method in accordance with claim 4 or claim 5 wherein the partially copolymerised mixture includes methyl methacrylate as the acrylic monomer and the glyceryl phthalate condensation resin is modified with ricinoleic acid.

7. A method of producing a varnish coat on articles of polyethylene, polystyrene or polyvinyl chloride or copolymers of said compounds substantially as described.

8. Articles of polyethylene, polystyrene or polyvinyl chloride having a surface, printed or plain coated with a varnish coat obtained by a method as claimed in claims 4 to 7.

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